Stoller
Grand Junction Office established 1959

GJO-2003-511-TAC

299-W18-88 (A7571)
Log Data Report

Borehole Information:

Borehole: 299-W18-88 (A7571)			**Site:** 216-Z-1A Crib		
Coordinates (WA State Plane)		**GWL (ft)[1]:** Dry		**GWL Date:**	9/11/2003
North	**East**	**Drill Date**	**TOC[2] Elevation**	**Total Depth (ft)**	**Type**
135,438.24 m	566,598.68 m	Sept. 1969	208.29 m	150	Cable Tool

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded steel	3.55	6 5/8	6	5/16	+2.55	150

The logging engineer measured the casing stickup using a steel tape. A caliper was used to determine the outside casing diameter. The caliper and inside casing diameter were measured using a steel tape, and measurements were rounded to the nearest 1/16 in. Casing thickness was calculated. Casing bottom is as reported from the well completion summary report (Ledgerwood 1993).

Borehole Notes:

Borehole coordinates, elevation, and well construction information, as shown in the above tables, are from measurements by Stoller field personnel, Ledgerwood (1993), and HWIS[3]. Zero reference is the top of the 6-in. casing.

Logging Equipment Information:

Logging System:	Gamma 1E		**Type:**	SGLS (70%) 34TP40587A
Calibration Date:	07/2003	**Calibration Reference:**	GJO-2003-468-TAR	
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0	

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2	3/Repeat		
Date	09/11/03	09/11/03	09/15/03		
Logging Engineer	Spatz	Spatz	Spatz		
Start Depth (ft)	149.0	127.0	25.0		
Finish Depth (ft)	126.0	3.0	10.0		
Count Time (sec)	100	100	100		
Live/Real	R	R	R		
Shield (Y/N)	N	N	N		
MSA Interval (ft)	1.0	1.0	1.0		
ft/min	N/A[4]	N/A	N/A		
Pre-Verification	AE034CAB	AE034CAB	AE036CAB		
Start File	AE034000	AE035000	AE036000		

Log Run	1	2	3/Repeat		
Finish File	AE034023	AE035124	AE036015		
Post-Verification	AE034CAA	AE035CAA	AE036CAA		
Depth Return Error (in.)	0	-1	0		
Comments	No fine-gain adjustment.	Fine-gain adjustment after files -016, -050, -069, and -116.	Repeat section.		

Logging Operation Notes:

Zero reference was top of the 6-in. casing. Logging was performed with a centralizer installed on the sonde. Pre- and post-survey verification measurements for the SGLS employed the Amersham KUT (^{40}K, ^{238}U, and ^{232}Th) verifier with serial number 118. Maximum logging depth achieved was 149 ft.

Analysis Notes:

Analyst:	Sobczyk	Date:	10/16/03	Reference:	GJO-HGLP 1.6.3, Rev. 0

SGLS pre-run and post-run verification spectra were collected at the beginning and end of each day. All of the verification spectra were within the acceptance criteria. The peak counts per second (cps) at the 609-keV, 1461-keV, and 2615-keV photopeaks on the post-run verification spectra as compared to the pre-run verification spectra were between 2.3 percent lower and 4.3 percent higher at the end of the day. Examinations of spectra indicate that the detector appears to have functioned normally during logging, and the spectra are accepted.

Log spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Pre-run verification spectra were used to determine the energy and resolution calibration for processing the data using APTEC SUPERVISOR. Concentrations were calculated in EXCEL (source file: G1EJul03.xls). Zero reference was the top of the 6-in. casing. On the basis of Ledgerwood (1993) and field measurements, the casing configuration was assumed as one string of 6-in. casing with a thickness of 5/16 inches to 149 ft (total logging depth). Dead time and water corrections were not required.

Log Plot Notes:

Separate log plots are provided for gross gamma and dead time, naturally occurring radionuclides (^{40}K, ^{238}U, and ^{232}Th), and man-made radionuclides. Plots of the repeat logs versus the original logs are included. For each radionuclide, the energy value of the spectral peak used for quantification is indicated. Unless otherwise noted, all radionuclides are plotted in picocuries per gram (pCi/g). The open circles indicate the minimum detectable level (MDL) for each radionuclide. Error bars on each plot represent error associated with counting statistics only and do not include errors associated with the inverse efficiency function, dead time correction, or casing correction. These errors are discussed in the calibration report. A combination plot is also included to facilitate correlation. The ^{214}Bi peak at 609 keV was used to determine the naturally occurring ^{238}U concentrations on the combination plot rather than the ^{214}Bi peak at 1764 keV because it exhibited slightly higher net counts per second.

Results and Interpretations:

^{137}Cs was the only man-made radionuclide detected in this borehole. ^{137}Cs was detected near the ground surface at 3 and 5 ft with a concentration near the MDL (0.2 pCi/g). ^{137}Cs was also detected at 25 ft and 87 ft with a concentration near the MDL. After examination of the spectra, it was determined that there is

no evidence of a photopeak at 662 keV at 25 ft and 87 ft. These reported peaks are probably the result of statistical fluctuation.

Recognizable changes in the KUT logs occurred in this borehole. Changes of 4 pCi/g or more in apparent ^{40}K concentrations occur at approximately 15, 55, 85, 97, 139, and 146 ft. Relative to the surrounding sediments, KUT concentrations are slightly elevated in the interval between 55 and 85 ft.

The plots of the repeat logs demonstrate reasonable repeatability of the SGLS data. The natural radionuclides at energy levels of 609, 1274, 1461, 1764, and 2614 keV are comparable between the repeat and original SGLS log runs. The ^{137}Cs detected at 25 ft on the original log run was not detected on the repeat log run.

References:

Ledgerwood, R.K., 1993. *Summaries of Well Construction Data and Field Observations for Existing 200-West Resource Protection Wells*, WHC-SD-ER-TI-005, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

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[1] GWL – groundwater level
[2] TOC – top of casing
[3] HWIS – Hanford Well Information System
[4] N/A – not applicable

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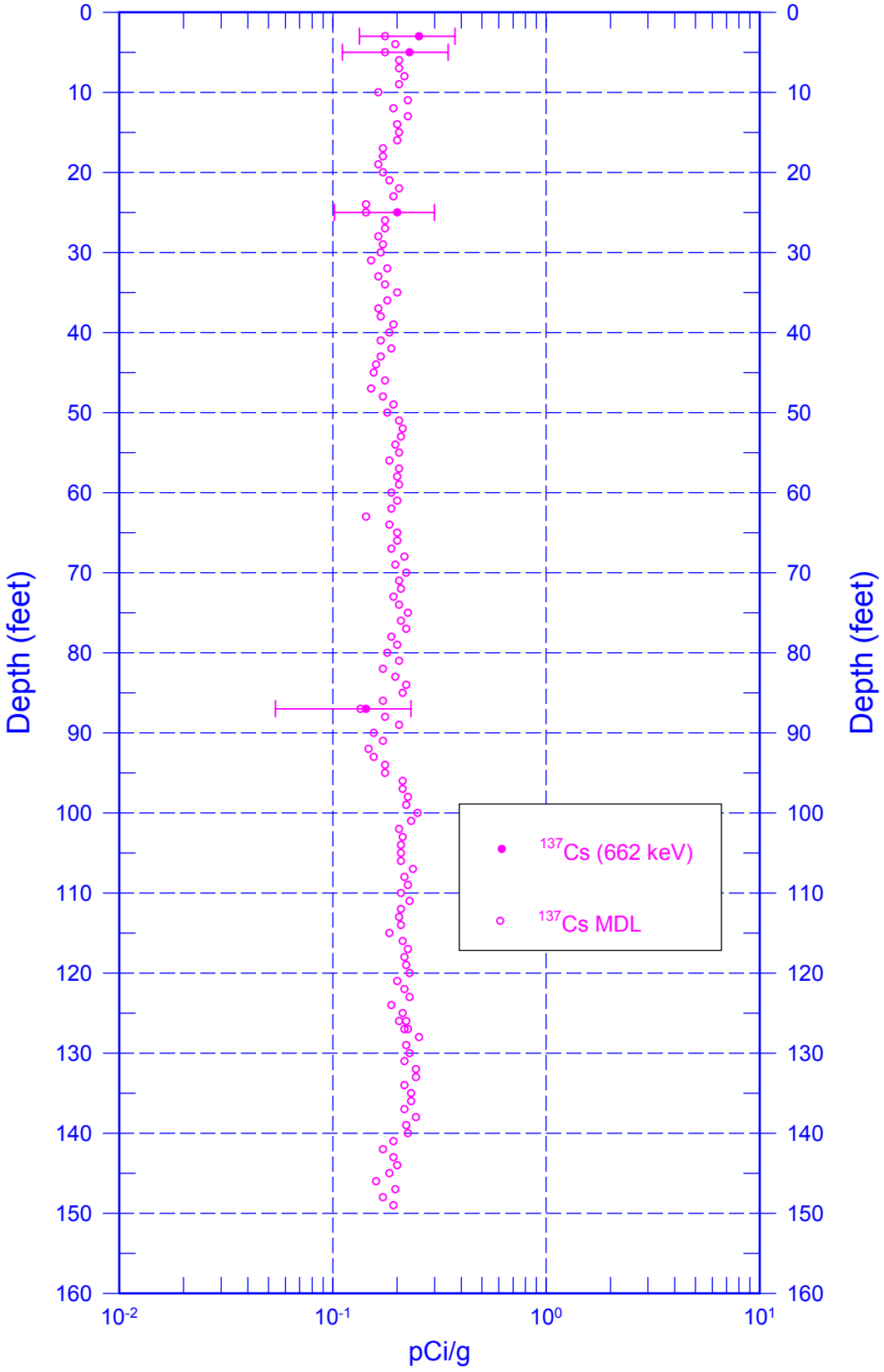
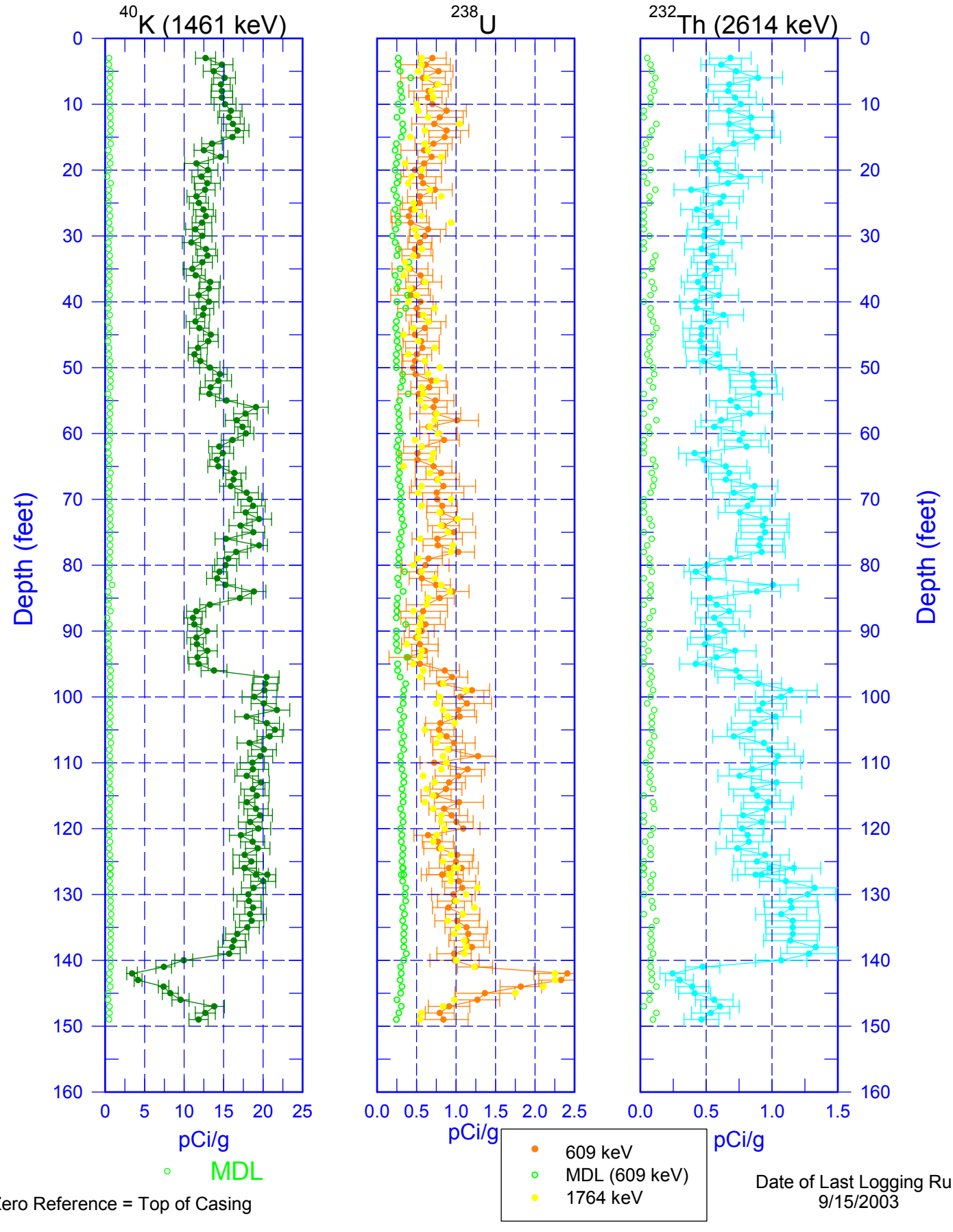
Man-Made Radionuclides



Zero Reference = Top of Casing

Date of Last Logging Run
9/15/2003

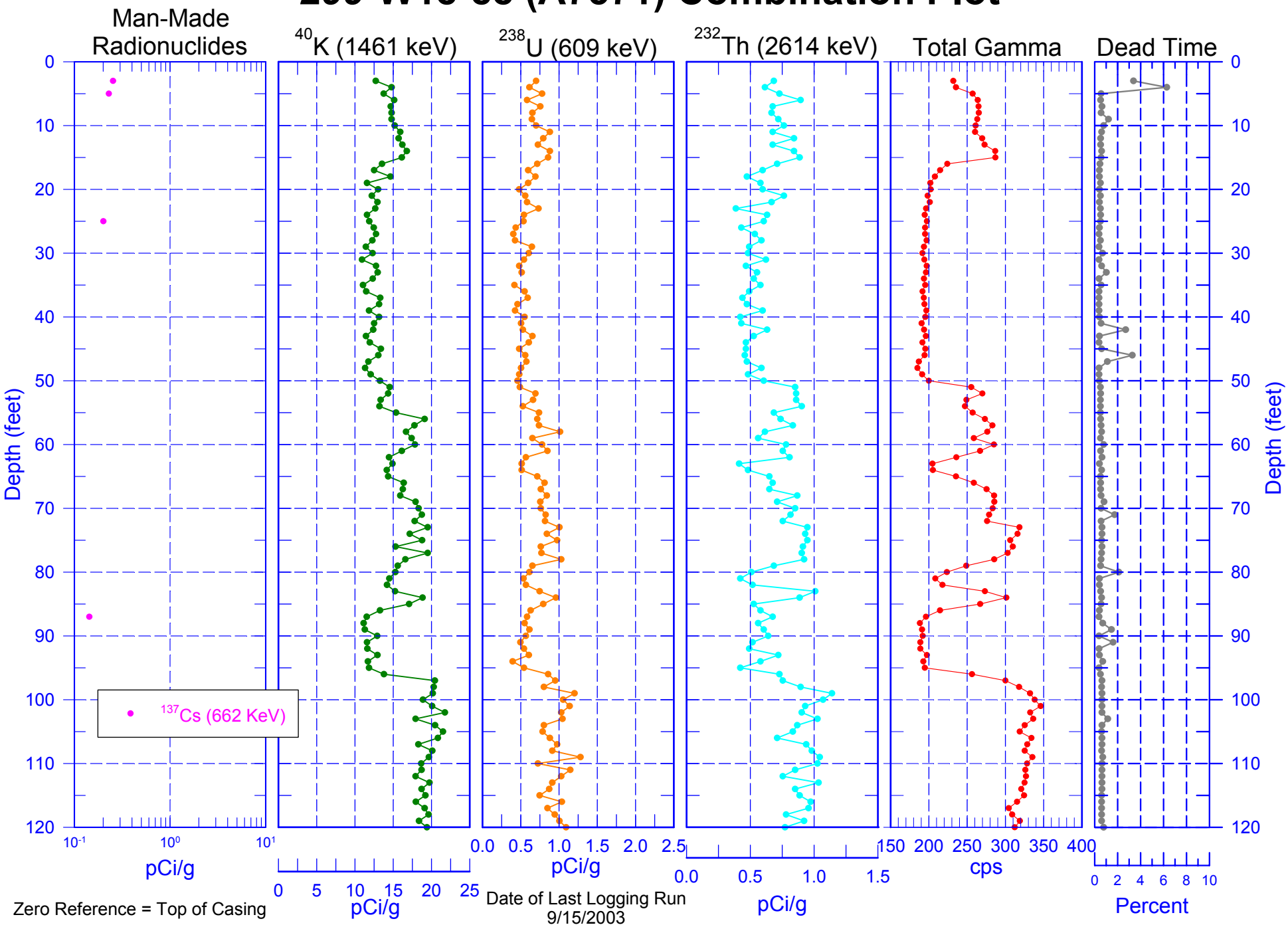
299-W18-88 (A7571)
Natural Gamma Logs



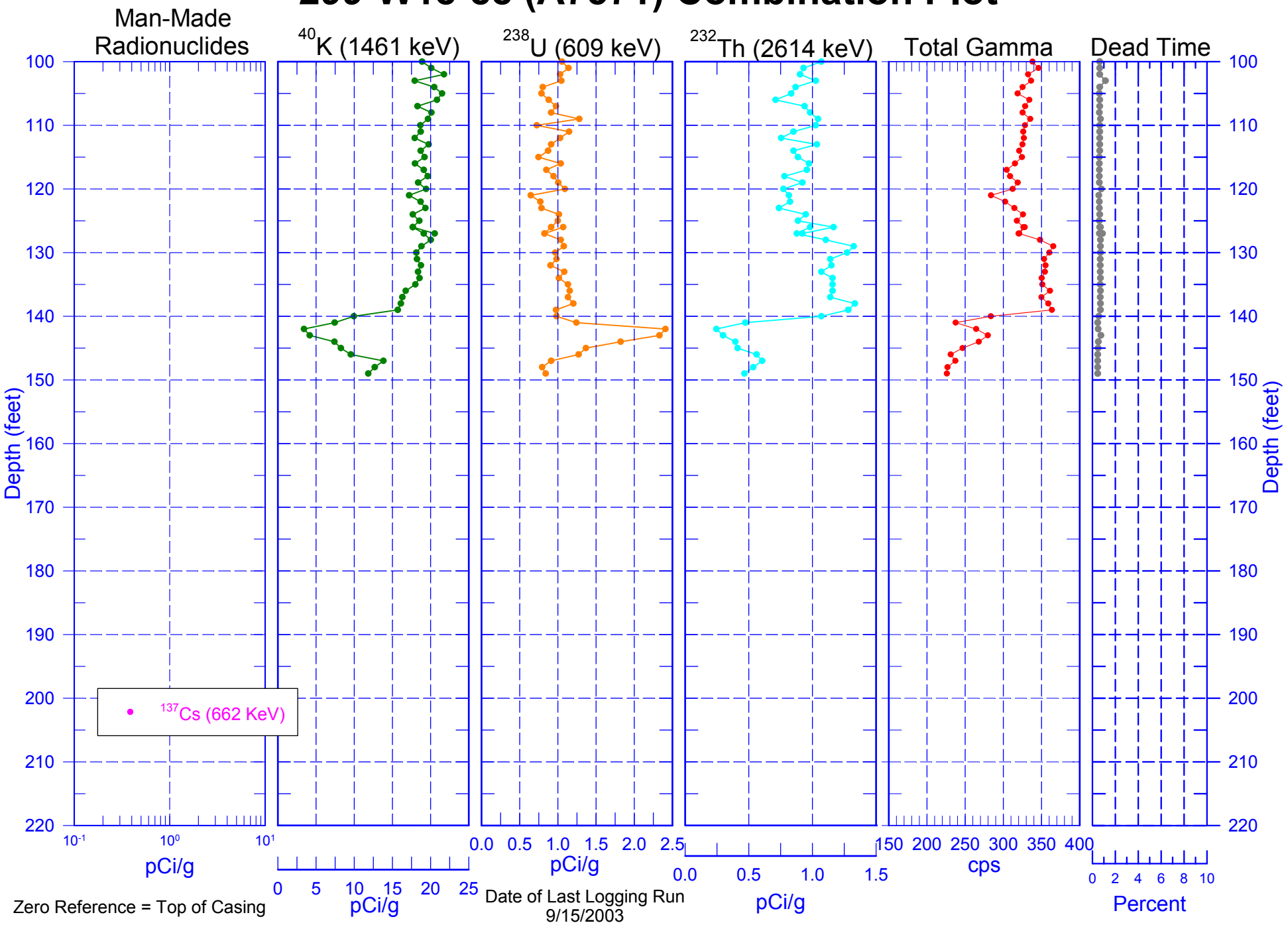
Zero Reference = Top of Casing

Date of Last Logging Run
9/15/2003

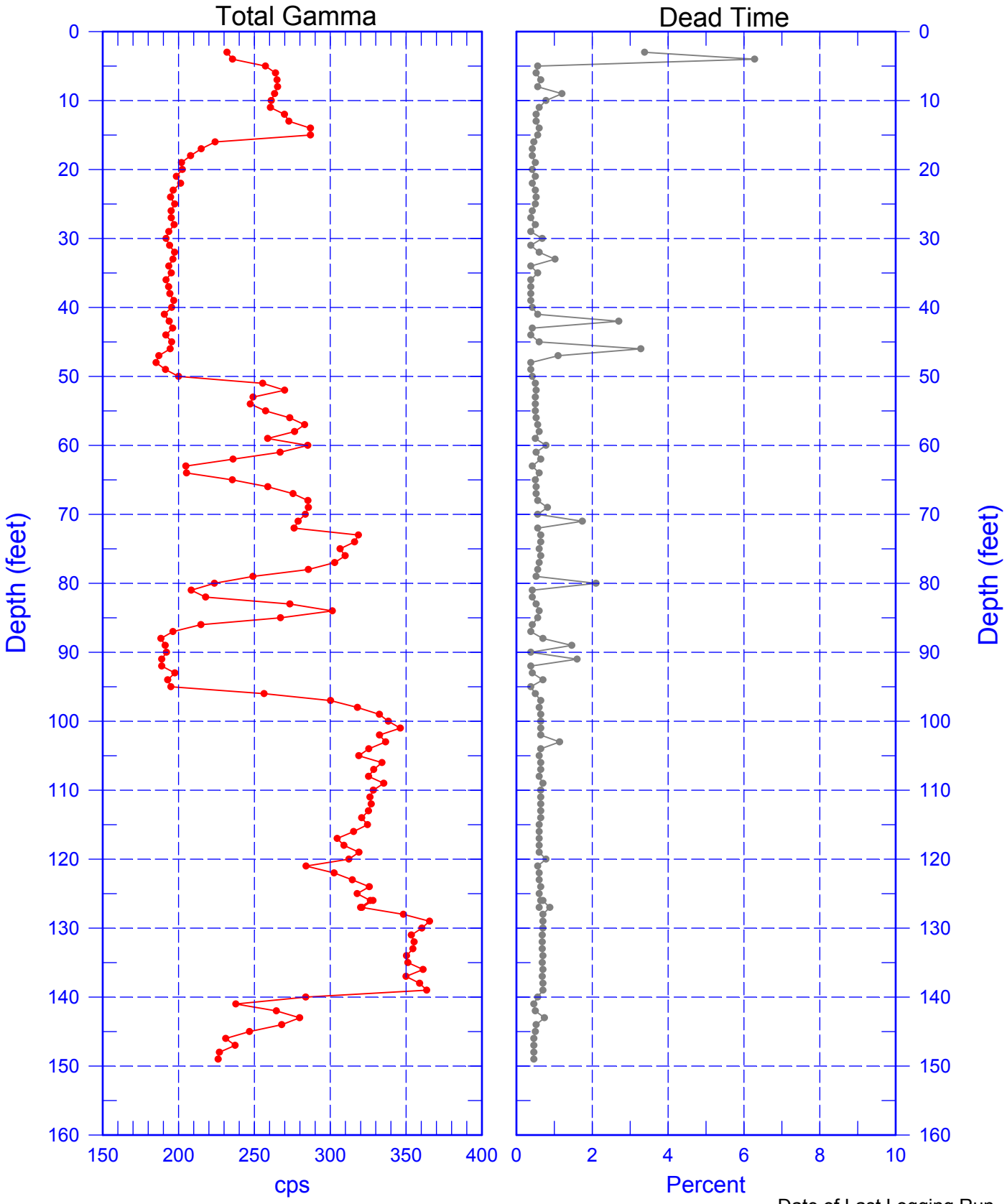
299-W18-88 (A7571) Combination Plot



299-W18-88 (A7571) Combination Plot



299-W18-88 (A7571)
Total Gamma & Dead Time



Date of Last Logging Run
9/15/2003

Zero Reference = Top of Casing

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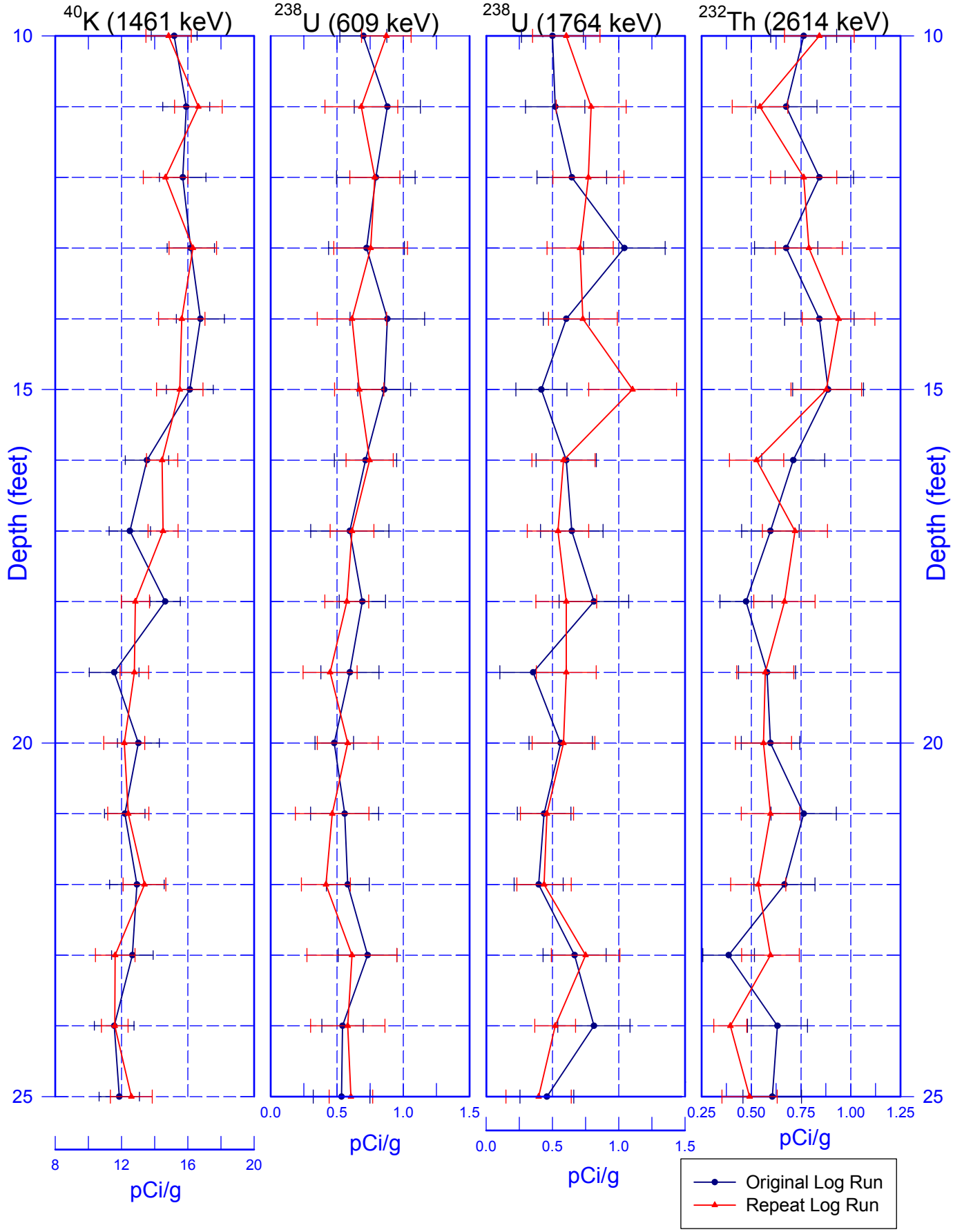
Rerun of Natural Gamma Logs (25.0 to 10.0 ft)



299-W18-88 (A7571)

Rerun of Man-Made Radionuclides (25.0 to 10.0 ft)